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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/758,286      | 01/16/2004  | Fumihiko Mochizuki   | Q79436              | 5152             |

23373 7590 12/08/2005  
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EXAMINER

DOLAN, JENNIFER M

ART UNIT PAPER NUMBER

2813

DATE MAILED: 12/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/758,286

Applicant(s)

MOCHIZUKI, FUMIHIKO

Examiner

Jennifer M. Dolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 5 and 6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 7-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/16/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-4 and 7-10, in the reply filed on 9/13/05 is acknowledged. Claims 5 and 6 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### ***Specification***

2. The disclosure is objected to because of the following informalities:

Starting on page 25, line 23, the specification frequently uses the term "multiplayer" rather than --multilayer--.

Appropriate correction is required.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 refers to a spatial light modulator array including plural spatial light modulators according to “claim 6.” Claim 6, however, is not drawn to a spatial light modulator, but rather, is drawn to a method for making an “optical functional film.” Since claim 7 is the claim drawn to a spatial light modulator, it is assumed for the purpose of examination that claim 8 depends upon claim 7 rather than claim 6.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,978,408 to Thornton.

Thornton discloses an optical functional film (the film is a wavelength dependent reflector, and thus is an “optical functional film” – see columns 4-6) comprising: a multilayer film (104, 114) having a plurality of stacked films wherein the films are formed of a same material (column 4, lines 34-40), refractive indices of adjacent ones of the plurality of films are

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different from each other (column 4, lines 50-67), and wherein the films have a characteristic substantially similar to CVD films (column 4, lines 25-30 – films are grown by a CVD process).

8. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2001/0048118 to Uchida et al.

Uchida discloses an optical functional film (film acts as a wavelength dependent absorber, and hence is an optical functional film) comprising: a multilayer film having a plurality of stacked films (3a, 3b- see figure 7), the plurality of films being formed of a same material (all films 3a, 3b are formed from InGaAs – see figure 7) and having different refractive indices of adjacent films (different composition InGaAs films will inherently have different refractive indices). Uchida further discloses that the stresses may have opposite signs and an equal magnitude (see paragraph 0054 – figures 3 and 5). Uchida additionally discloses that the layers are formed by “MOVPE” (see paragraph 0031), which is synonymous with MOCVD – a CVD process.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,327,071 to Kimura in view of Thornton

Kimura discloses a spatial light modulator (figures 1, 15, 22) comprising: a support substrate (1, 221) having an electrode layer (2; also see column 13, lines 45-46 – “on-substrate electrode”); a movable thin film (4, 222) having an electrode layer (7, also see column 13, line 48 – “on-diaphragm electrode”), the movable thin film having an opposing placement above the support substrate and separated by a gap distance (see figures 1, 15, 22), such that the movable thin film is flexurally deformable toward the support substrate (see figures 1, 15, 22; column 13, lines 44-50, wherein application of a driving voltage between the electrodes causes the movable film to be deflected toward the support substrate by an electrostatic force between the electrode layers (see column 5, line 45 – column 6, line 9), whereby optical characteristics of the device are changed to perform light modulation on the incident light (column 1, lines 25-35; column 14, lines 20-45), and wherein multilayer stacked film reflectors (225, 226) are disposed on opposing sides of the movable thin film and the support substrate (figure 22), and wherein the optical characteristics are interference characteristics corresponding to the gap distance between the thin film and the support substrate and the wavelength of the incident light (column 13, lines 1-40). Kimura further discloses using the spatial light modulator in a two-dimensional array (column 6, lines 35-42), such that the array is part of a flat panel display (column 1, lines 5-15) including a UV light source (column 13, lines 50-60; column 3, lines 1-20), an illumination optical system illuminating the spatial light modulator, and a fluorescent member which is excited by light emitted from the spatial light modulator array to emit light (phosphor element – see column 2 line 65 – column 3, line 20).

Kimura does not specify the material composition of the multilayer reflective stacks.

Thornton discloses the multilayer reflective stacks according to claim 1: comprising: a multilayer film (104, 114) having a plurality of stacked films wherein the films are formed of a same material (column 4, lines 34-40), refractive indices of adjacent ones of the plurality of films are different from each other (column 4, lines 50-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the stacked film mirrors used in the display systems and spatial light modulators in Kimura are in the "same material" type stacked DBR films as taught in Thornton. The rationale is as follows: A person having ordinary skill in the art would have been motivated to use the stacked DBR films of Thornton as the stacked film mirror elements, because Thornton shows that such layers have the advantageous properties of acting as highly compact mirrors having a high degree of controllability of the reflectance, (see Thornton, column 4, lines 34-67; column 5, lines 1-5; 55-67), which would be ideal and necessary for mirrors disposed on a flexing portion, as in Kimura. Since the layers in Thornton additionally have a vast difference in ability to oxidize (see Thornton, column 6, lines 32-45), the specific stack in Thornton is advantageous in that the refractive index between oxidized Al-rich AlGaAs and relatively unoxidized, Al-poor AlGaAs is very high, enabling very high reflectivity with fewer required layer pairs (see Thornton, column 5, lines 1-5).

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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- a. M.C. Larson et al : “ Vertical Coupled Cavity Microinterferometer” article in IEEE Photonics Technology Letters – discloses an interferometric structure using a deformable top mirror and a GaAs/AlAs stacked DBR bottom mirror
- b. U.S. Patent No. 6,324,192 to Tayebati discloses interferometric structures using very high contrast stacked mirror structures applied to a cantilever/MEMs structure.
- c. U.S. Patent Publication No. 2003/0116711 to Hara et al. discloses a fabry-perot filter using Si/SiO/Si mirror stacks.
- d. U.S. Patent No. 5,291,502 to Pezeshki et al. discloses a fabry-perot cavity using one metallic reflector and one AlGaAs/AlAs stacked DBR reflector.
- e. U.S. Patent Publication No. 2002/0154675 to Deng et al. discloses a DBR film formed of different composition AlGaAs layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.




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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan  
Examiner  
Art Unit 2813

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